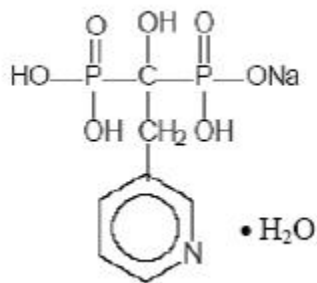


RISEDRONATE SODIUM - risedronate sodium tablet, film coated

Teva Pharmaceuticals USA

DESCRIPTION

Risedronate sodium tablets are a pyridinyl bisphosphonate that inhibits osteoclast-mediated bone resorption and modulates bone metabolism. Each risedronate sodium tablet for oral administration contains the equivalent of 5, 30, or 35 mg of anhydrous risedronate sodium in the form of the monohydrate. The chemical name of risedronate sodium is [1-hydroxy-2-(3-pyridinyl)ethylidene]bis[phosphonic acid] monosodium salt. The chemical structure of risedronate sodium monohydrate is the following:



$C_7H_{10}NO_7P_2 Na \cdot H_2O$ M.W. Monohydrate: 323.10

Anhydrous: 305.10

Risedronate sodium monohydrate is a white to off-white powder. It is soluble in water and in aqueous solutions, and essentially insoluble in common organic solvents.

Inactive Ingredients

Colloidal silicon dioxide, D&C yellow #10 lake (5 mg tablets only), FD&C yellow #6 aluminum lake (35 mg tablets only), hypromellose, iron oxide red (35 mg tablets only), iron oxide yellow (5 and 35 mg tablets only), lactose monohydrate, magnesium stearate, polyethylene glycol, polysorbate 80, pregelatinized starch, sodium stearyl fumarate, starch, and titanium dioxide.

CLINICAL PHARMACOLOGY

Mechanism of Action

Risedronate has an affinity for hydroxyapatite crystals in bone and acts as an antiresorptive agent. At the cellular level, risedronate inhibits osteoclasts. The osteoclasts adhere normally to the bone surface, but show evidence of reduced active resorption (e.g., lack of ruffled border). Histomorphometry in rats, dogs, and minipigs showed that risedronate treatment reduces bone turnover (activation frequency, i.e., the rate at which bone remodeling sites are activated) and bone resorption at remodeling sites.

Pharmacokinetics

Absorption

Absorption after an oral dose is relatively rapid (t_{max} ~1 hour) and occurs throughout the upper gastrointestinal tract. The fraction of the dose absorbed is independent of dose over the range studied (single dose, from 2.5 to 30 mg; multiple dose, from 2.5 to 5 mg). Steady-state conditions in the serum are observed within 57 days of daily dosing. Mean absolute oral bioavailability of the 30 mg tablet is 0.63% (90% CI: 0.54% to 0.75%) and is comparable to a solution. The extent of absorption of a 30 mg dose (three 10 mg tablets) when administered 0.5 hours before breakfast is reduced by 55% compared to dosing in the fasting state (no food or drink for 10 hours prior to or 4 hours after dosing). Dosing 1 hour prior to breakfast reduces the extent of absorption by 30% compared to dosing in the fasting state. Dosing either 0.5 hours prior to breakfast or 2 hours after dinner (evening meal) results in a similar extent of absorption. Risedronate is effective when administered at least 30 minutes before breakfast.

Distribution

The mean steady-state volume of distribution is 6.3 L/kg in humans. Human plasma protein binding of drug is about 24%. Preclinical studies in rats and dogs dosed intravenously with single doses of [^{14}C] risedronate indicate that approximately 60% of the dose is distributed to bone. The remainder of the dose is excreted in the urine. After multiple oral dosing in rats, the uptake of risedronate in soft tissues was in the range of 0.001% to 0.01%.

Metabolism

There is no evidence of systemic metabolism of risedronate.

Elimination

Approximately half of the absorbed dose is excreted in urine within 24 hours, and 85% of an intravenous dose is recovered in the urine over 28 days. Mean renal clearance is 105 mL/min (CV = 34%) and mean total clearance is 122 mL/min (CV = 19%), with the difference primarily reflecting nonrenal clearance or clearance due to adsorption to bone. The renal clearance is not concentration dependent, and there is a linear relationship between renal clearance and creatinine clearance. Unabsorbed drug is eliminated unchanged in feces. Once risedronate is absorbed, the serum concentration-time profile is multi-phasic, with an initial half-life of about 1.5 hours and a terminal exponential half-life of 480 hours. This terminal half-life is hypothesized to represent the dissociation of risedronate from the surface of bone.

Special Populations

Pediatric

Risedronate pharmacokinetics have not been studied in patients < 18 years of age.

Gender

Bioavailability and pharmacokinetics following oral administration are similar in men and women.

Geriatric

Bioavailability and disposition are similar in elderly (> 60 years of age) and younger subjects. No dosage adjustment is necessary.

Race

Pharmacokinetic differences due to race have not been studied.

Renal Insufficiency

Risedronate is excreted unchanged primarily via the kidney. As compared to persons with normal renal function, the renal clearance of risedronate was decreased by about 70% in patients with creatinine clearance of approximately 30 mL/min. Risedronate is not recommended for use in patients with severe renal impairment (creatinine clearance < 30 mL/min) because of lack of clinical experience. No dosage adjustment is necessary in patients with a creatinine clearance \geq 30 mL/min.

Hepatic Insufficiency

No studies have been performed to assess risedronate's safety or efficacy in patients with hepatic impairment. Risedronate is not metabolized in rat, dog, and human liver preparations. Insignificant amounts (< 0.1% of intravenous dose) of drug are excreted in the bile in rats. Therefore, dosage adjustment is unlikely to be needed in patients with hepatic impairment.

Pharmacodynamics

Treatment and Prevention of Osteoporosis in Postmenopausal Women

Osteoporosis is characterized by decreased bone mass and increased fracture risk, most commonly at the spine, hip, and wrist.

The diagnosis can be confirmed by the finding of low bone mass, evidence of fracture on x-ray, a history of osteoporotic fracture, or height loss or kyphosis indicative of vertebral fracture. Osteoporosis occurs in both men and women but is more common among women following menopause. In healthy humans, bone formation and resorption are closely linked; old bone is resorbed and replaced by newly-formed bone. In postmenopausal osteoporosis, bone resorption exceeds bone formation, leading to bone loss and increased risk of bone fracture. After menopause, the risk of fractures of the spine and hip increases; approximately 40% of 50 year-old women will experience an osteoporosis-related fracture during their remaining lifetimes. After experiencing 1 osteoporosis-related fracture, the risk of future fracture increases 5 fold compared to the risk among a non-fractured population.

Risedronate treatment decreases the elevated rate of bone turnover that is typically seen in postmenopausal osteoporosis. In clinical trials, administration of risedronate to postmenopausal women resulted in decreases in biochemical markers of bone turnover, including urinary deoxypyridinoline/creatinine and urinary collagen cross-linked N-telopeptide (markers of bone resorption) and serum bone specific alkaline phosphatase (a marker of bone formation). At the 5 mg dose, decreases in deoxypyridinoline/creatinine were evident within 14 days of treatment. Changes in bone formation markers were observed later than changes in resorption markers, as expected, due to the coupled nature of bone resorption and bone formation; decreases in bone specific alkaline phosphatase of about 20% were evident within 3 months of treatment. Bone turnover markers reached a nadir of about 40% below baseline values by the sixth month of treatment and remained stable with continued treatment for up to 3 years. Bone turnover is decreased as early as 14 days and maximally within about 6 months of treatment, with achievement of a new steady state that more nearly approximates the rate of bone turnover seen in premenopausal women. In a 1 year study comparing daily versus weekly oral dosing regimens of risedronate for the treatment of osteoporosis in postmenopausal women, risedronate sodium tablets 5 mg daily and risedronate sodium tablets 35 mg once a week decreased urinary collagen cross-linked N-telopeptide by 60% and 61%, respectively. In addition, serum bone-specific alkaline phosphatase was also reduced by 42% and 41% in the risedronate sodium tablets 5 mg daily and risedronate sodium tablets 35 mg once a week groups, respectively. When postmenopausal women with osteoporosis were treated for 1 year with

risedronate sodium tablets 5 mg daily, urinary collagen cross-linked N-telopeptide was decreased by 54% and serum bone-specific alkaline phosphatase was reduced by 36%. Risedronate is not an estrogen and does not have the benefits and risks of estrogen therapy.

Glucocorticoid-Induced Osteoporosis

Sustained use of glucocorticoids is commonly associated with development of osteoporosis and resulting fractures (especially vertebral, hip, and rib). It occurs in both males and females of all ages. The relative risk of a hip fracture in patients on > 7.5 mg/day prednisone is more than doubled (RR = 2.27); the relative risk of vertebral fracture is increased 5 fold (RR = 5.18). Bone loss occurs most rapidly during the first 6 months of therapy with persistent but slowing bone loss for as long as glucocorticoid therapy continues. Osteoporosis occurs as a result of inhibited bone formation and increased bone resorption resulting in net bone loss. Risedronate decreases bone resorption without directly inhibiting bone formation.

In two 1 year clinical trials in the treatment and prevention of glucocorticoid-induced osteoporosis, risedronate sodium tablets 5 mg decreased urinary collagen cross-linked N-telopeptide (a marker of bone resorption), and serum bone specific alkaline phosphatase (a marker of bone formation) by 50% to 55% and 25% to 30%, respectively, within 3 to 6 months after initiation of therapy.

Paget's Disease

Paget's disease of bone is a chronic, focal skeletal disorder characterized by greatly increased and disordered bone remodeling. Excessive osteoclastic bone resorption is followed by osteoblastic new bone formation, leading to the replacement of the normal bone architecture by disorganized, enlarged, and weakened bone structure.

Clinical manifestations of Paget's disease range from no symptoms to severe bone pain, bone deformity, pathological fractures, and neurological disorders. Serum alkaline phosphatase, the most frequently used biochemical marker of disease activity, provides an objective measure of disease severity and response to therapy.

In pagetic patients treated with risedronate sodium tablets 30 mg daily for 2 months, bone turnover returned to normal in a majority of patients as evidenced by significant reductions in serum alkaline phosphatase (a marker of bone formation), and in urinary hydroxyproline/creatinine and deoxypyridinoline/creatinine (markers of bone resorption). Radiographic structural changes of bone lesions, especially improvement of a majority of lesions with an osteolytic front in weight-bearing bones, were also observed after risedronate treatment. In addition, histomorphometric data provide further support that risedronate can lead to a more normal bone structure in these patients.

Radiographs taken at baseline and after 6 months from patients treated with risedronate sodium tablets 30 mg daily demonstrate that risedronate decreases the extent of osteolysis in both the appendicular and axial skeleton. Osteolytic lesions in the lower extremities improved or were unchanged in 15/16 (94%) of assessed patients; 9/16 (56%) patients showed clear improvement in osteolytic lesions. No evidence of new fractures was observed.

CLINICAL STUDIES

Treatment of Osteoporosis in Postmenopausal Women

The fracture efficacy of risedronate sodium tablets 5 mg daily in the treatment of postmenopausal osteoporosis was demonstrated in 2 large, randomized, placebo-controlled, double-blind studies that enrolled a total of almost 4000 postmenopausal women under similar protocols. The Multinational study (VERT MN) (risedronate sodium tablets 5 mg, n = 408) was conducted primarily in Europe and Australia; a second study was conducted in North America (VERT NA) (risedronate sodium tablets 5 mg, n = 821). Patients were selected on the basis of radiographic evidence of previous vertebral fracture, and therefore, had established disease. The average number of prevalent vertebral fractures per patient at study entry was 4 in VERT MN, and 2.5 in VERT NA, with a broad range of baseline bone mineral density (BMD) levels. All patients in these studies received supplemental calcium 1000 mg/day. Patients with low vitamin D levels (approximately 40 nmol/L or less) also received supplemental vitamin D 500 IU/day.

Effect on Vertebral Fractures

Fractures of previously undeformed vertebrae (new fractures) and worsening of preexisting vertebral fractures were diagnosed radiographically; some of these fractures were also associated with symptoms (i.e., clinical fractures). Spinal radiographs were scheduled annually and prospectively planned analyses were based on the time to a patient's first diagnosed fracture. The primary endpoint for these studies was the incidence of new and worsening vertebral fractures across the period of 0 to 3 years. Risedronate sodium tablets 5 mg daily significantly reduced the incidence of new and worsening vertebral fractures and of new vertebral fractures in both VERT NA and VERT MN at all time points (**Table 1**). The reduction in risk seen in the subgroup of patients who had 2 or more vertebral fractures at study entry was similar to that seen in the overall study population.

Table 1: The Effect of Risedronate on the Risk of Vertebral Fractures

VERT NA	Proportion of Patients with Fracture (%) ^a		Absolute Risk Reduction (%)	Relative Risk Reduction (%)
	Placebo n = 678	Risedronate Sodium Tablets 5 mg n = 696		
New and Worsening				
0 to 1 Year	7.2	3.9	3.3	49
0 to 2 Years	12.8	8.0	4.8	42
0 to 3 Years	18.5	13.9	4.6	33
New				
0 to 1 Year	6.4	2.4	4.0	65
0 to 2 Years	11.7	5.8	5.9	55
0 to 3 Years	16.3	11.3	5.0	41
VERT MN	Placebo n = 346	Risedronate Sodium Tablets 5 mg n = 344	Absolute Risk Reduction (%)	Relative Risk Reduction (%)
New and Worsening				
0 to 1 Year	15.3	8.2	7.1	50
0 to 2 Years	28.3	13.9	14.4	56
0 to 3 Years	34.0	21.8	12.2	46
New				
0 to 1 Year	13.3	5.6	7.7	61
0 to 2 Years	24.7	11.6	13.1	59
0 to 3 Years	29.0	18.1	10.9	49

^a Calculated by Kaplan-Meier methodology.

Effect on Osteoporosis-Related Nonvertebral Fractures

In VERT MN and VERT NA, a prospectively planned efficacy endpoint was defined consisting of all radiographically confirmed fractures of skeletal sites accepted as associated with osteoporosis. Fractures at these sites were collectively referred to as osteoporosis-related nonvertebral fractures. Risedronate sodium tablets 5 mg daily significantly reduced the incidence of nonvertebral osteoporosis-related fractures over 3 years in VERT NA (8% vs. 5%; relative risk reduction 39%) and reduced the fracture incidence in VERT MN from 16% to 11%. There was a significant reduction from 11% to 7% when the studies were combined, with a corresponding 36% reduction in relative risk. **Figure 1** shows the overall results as well as the results at the individual skeletal sites for the combined studies.

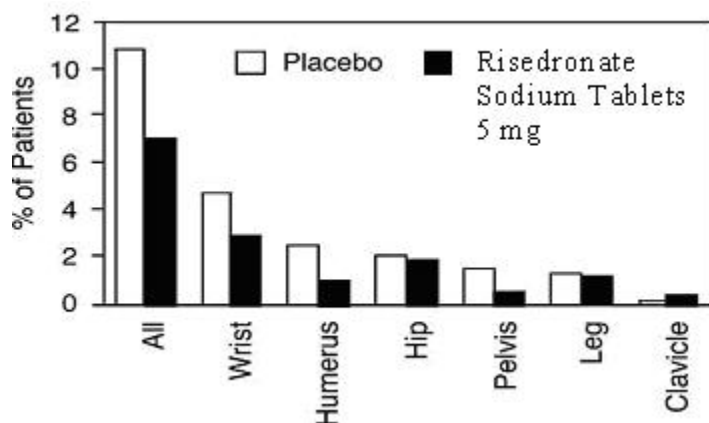


Figure 1: Nonvertebral Osteoporosis-Related Fractures Cumulative Incidence Over 3 Years Combined VERT MN and VERT NA

Effect on Height

In the two 3 year osteoporosis treatment studies, standing height was measured yearly by stadiometer. Both risedronate- and placebo-treated groups lost height during the studies. Patients who received risedronate had a statistically significantly smaller loss of height than those who received placebo. In VERT MN, the median annual height change was -1.3 mm/yr in the risedronate sodium tablets 5

mg daily group compared to -2.4 mm/yr in the placebo group. In VERT NA, the median annual height change was -0.7 mm/yr in the risedronate sodium tablets 5 mg daily group compared to -1.1 mm/yr in the placebo group.

Effect on Bone Mineral Density

The results of 4 randomized, placebo-controlled trials in women with postmenopausal osteoporosis (VERT MN, VERT NA, BMD MN, BMD NA) demonstrate that risedronate sodium tablets 5 mg daily increases BMD at the spine, hip, and wrist compared to the effects seen with placebo. **Table 2** displays the significant increases in BMD seen at the lumbar spine, femoral neck, femoral trochanter, and midshaft radius in these trials compared to placebo. Thus, overall risedronate reverses the loss of BMD, a central factor in the progression of osteoporosis. In both VERT studies (VERT MN and VERT NA), risedronate sodium tablets 5 mg daily produced increases in lumbar spine BMD that were progressive over the 3 years of treatment, and were statistically significant relative to baseline and to placebo at 6 months and at all later time points.

Table 2: Mean Percent Increase in BMD from Baseline in Patients Taking Risedronate Sodium Tablets 5 mg or Placebo at Endpoint^a

	VERT MN ^b		VERT NA ^b		BMD MN ^c		BMD NA ^c	
	Placebo n = 323	5 mg n = 323	Placebo n = 599	5 mg n = 606	Placebo n = 161	5 mg n = 148	Placebo n = 191	5 mg n = 193
Lumbar Spine	1.0	6.6	0.8	5.0	0.0	4.0	0.2	4.8
Femoral Neck	-1.4	1.6	-1.0	1.4	-1.1	1.3	0.1	2.4
Femoral Trochanter	-1.9	3.9	-0.5	3.0	-0.6	2.5	1.3	4.0
Midshaft Radius	-1.5*	0.2*	-1.2*	0.1*	ND		ND	

^a The endpoint value is the value at the study's last time point for all patients who had BMD measured at that time; otherwise the last postbaseline BMD value prior to the study's last time point is used.

^b The duration of the studies was 3 years.

^c The duration of the studies was 1.5 to 2 years.

* BMD of the midshaft radius was measured in a subset of centers in VERT MN (placebo, n = 222; 5 mg, n = 214) and VERT NA (placebo, n = 310; 5 mg, n = 306)

ND = analysis not done

Risedronate sodium tablets 35 mg once a week (n = 485) was shown to be non-inferior to risedronate sodium tablets 5 mg daily (n = 480) in a 1 year, double-blind, multicenter study of postmenopausal women with osteoporosis. In the primary efficacy analysis of completers, the mean increases from baseline in lumbar spine BMD at 1 year were 4.0% (3.7, 4.3; 95% confidence interval [CI] in the 5 mg daily group (n = 391) and 3.9% (3.6, 4.3; 95% CI) in the 35 mg once a week group (n = 387) and the mean difference between 5 mg daily and 35 mg weekly was 0.1% (-0.4, 0.6; 95% CI). The results of the intent-to-treat analysis with the last observation carried forward were consistent with the primary efficacy analysis of completers. The 2 treatment groups were also similar with regard to BMD increases at other skeletal sites.

Histology/Histomorphometry

Bone biopsies from 110 postmenopausal women were obtained at endpoint. Patients had received daily risedronate sodium tablets (2.5 mg or 5 mg) or placebo for 2 to 3 years. Histologic evaluation (n = 103) showed no osteomalacia, impaired bone mineralization, or other adverse effects on bone in risedronate-treated women. These findings demonstrate that bone formed during risedronate administration is of normal quality. The histomorphometric parameter mineralizing surface, an index of bone turnover, was assessed based upon baseline and post-treatment biopsy samples from 23 patients treated with risedronate sodium tablets 5 mg and 21 treated with placebo. Mineralizing surface decreased moderately in risedronate-treated patients (median percent change: risedronate sodium tablets 5 mg, -74%; placebo, -21%), consistent with the known effects of treatment on bone turnover.

Prevention of Osteoporosis in Postmenopausal Women

Risedronate sodium tablets 5 mg daily prevented bone loss in a majority of postmenopausal women (age range 42 to 63 years) within 3 years of menopause in a 2 year, double-blind, placebo-controlled study in 383 patients (risedronate sodium tablets 5 mg, n = 129). All patients in this study received supplemental calcium 1000 mg/day. Increases in BMD were observed as early as 3 months

following initiation of risedronate treatment. Risedronate sodium tablets 5 mg produced significant mean increases in BMD at the lumbar spine, femoral neck, and trochanter compared to placebo at the end of the study (**Figure 2**). Risedronate sodium tablets 5 mg daily was also effective in patients with lower baseline lumbar spine BMD (more than 1 SD below the premenopausal mean) and in those with normal baseline lumbar spine BMD. Bone mineral density at the distal radius decreased in both risedronate- and placebo-treated women following 1 year of treatment.

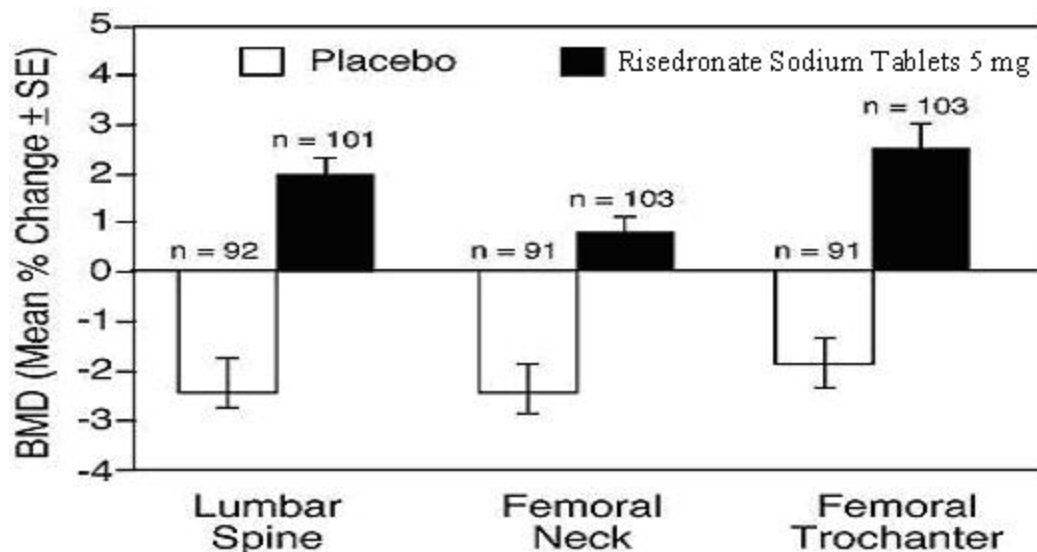


Figure 2: Change in BMD From Baseline 2 Year Prevention Study

Combined Administration with Hormone Replacement Therapy

The effects of combining risedronate sodium tablets 5 mg daily with conjugated estrogen 0.625 mg daily (n = 263) were compared to the effects of conjugated estrogen alone (n = 261) in a 1 year, randomized, double-blind study of women ages 37 to 82 years, who were on average 14 years postmenopausal. The BMD results for this study are presented in **Table 3**.

Table 3: Percent Change from Baseline in BMD After 1 Year of Treatment

	Estrogen 0.625 mg n = 261	Risedronate Sodium Tablets 5 mg + Estrogen 0.625 mg n = 263
Lumbar Spine	4.6 ± 0.20	5.2 ± 0.23
Femoral Neck	1.8 ± 0.25	2.7 ± 0.25
Femoral Trochanter	3.2 ± 0.28	3.7 ± 0.25
Midshaft Radius	0.4 ± 0.14	0.7 ± 0.17
Distal Radius	1.7 ± 0.24	1.6 ± 0.28
Values shown are mean (± SEM) percent change from baseline.		

Histology/Histomorphometry

Bone biopsies from 53 postmenopausal women were obtained at endpoint. Patients had received risedronate sodium tablets 5 mg plus estrogen or estrogen alone once daily for 1 year. Histologic evaluation (n = 47) demonstrated that the bone of patients treated with risedronate plus estrogen was of normal lamellar structure and normal mineralization. The histomorphometric parameter mineralizing surface, a measure of bone turnover, was assessed based upon baseline and post-treatment biopsy samples from 12 patients treated with risedronate plus estrogen and 12 treated with estrogen alone. Mineralizing surface decreased in both treatment groups (median percent change: risedronate plus estrogen, -79%; estrogen alone, -50%), consistent with the known effects of these agents on bone turnover.

Glucocorticoid-Induced Osteoporosis

Bone Mineral Density

Two 1 year, double-blind, placebo-controlled trials in patients who were taking ≥ 7.5 mg/day of prednisone or equivalent demonstrated that risedronate sodium tablets 5 mg once daily was effective in the prevention and treatment of glucocorticoid-induced osteoporosis in men and women who were either initiating or continuing glucocorticoid therapy.

The prevention study enrolled 228 patients (risedronate sodium tablets 5 mg, n = 76) (18 to 85 years of age), each of whom had initiated glucocorticoid therapy (mean daily dose of prednisone 21 mg) within the previous 3 months (mean duration of use prior to

study 1.8 months) for rheumatic, skin, and pulmonary diseases. The mean lumbar spine BMD was normal at baseline (average T-score -0.7). All patients in this study received supplemental calcium 500 mg/day. By the third month of treatment, and continuing through the year-long treatment, the placebo group experienced losses in BMD at the lumbar spine, femoral neck, and trochanter, while BMD was maintained or increased in the risedronate sodium tablets 5 mg group. At each skeletal site there were statistically significant differences between the risedronate sodium tablets 5 mg group and the placebo group at all timepoints (Months 3, 6, 9, and 12). The treatment differences increased with continued treatment. Although BMD increased at the distal radius in the risedronate sodium tablets 5 mg group compared to the placebo group, the difference was not statistically significant. The differences between placebo and risedronate sodium tablets 5 mg after 1 year were 3.8% at the lumbar spine, 4.1% at the femoral neck, and 4.6% at the trochanter, as shown in **Figure 3**. The results at these skeletal sites were similar to the overall results when the subgroups of men and postmenopausal women, but not premenopausal women, were analyzed separately. Risedronate was effective at the lumbar spine, femoral neck, and trochanter regardless of age (< 65 vs. ≥ 65), gender, prior and concomitant glucocorticoid dose, or baseline BMD. Positive treatment effects were also observed in patients taking glucocorticoids for a broad range of rheumatologic disorders, the most common of which were rheumatoid arthritis, temporal arteritis, and polymyalgia rheumatica.

The treatment study of similar design enrolled 290 patients (risedronate sodium tablets 5 mg, n = 100) (19 to 85 years of age) with continuing, long-term (≥ 6 months) use of glucocorticoids (mean duration of use prior to study 60 months; mean daily dose of prednisone 15 mg) for rheumatic, skin, and pulmonary diseases. The baseline mean lumbar spine BMD was low (1.63 SD below the young healthy population mean), with 28% of the patients more than 2.5 SD below the mean. All patients in this study received supplemental calcium 1000 mg/day and vitamin D 400 IU/day.

After 1 year of treatment, the BMD of the placebo group was within ± 1% of baseline levels at the lumbar spine, femoral neck, and trochanter. Risedronate sodium tablets 5 mg increased BMD at the lumbar spine (2.9%), femoral neck (1.8%), and trochanter (2.4%). The differences between risedronate and placebo were 2.7% at the lumbar spine, 1.9% at the femoral neck, and 1.6% at the trochanter as shown in **Figure 4**. The differences were statistically significant for the lumbar spine and femoral neck, but not at the femoral trochanter. Risedronate was similarly effective on lumbar spine BMD regardless of age (< 65 vs. ≥ 65), gender, or pre-study glucocorticoid dose. Positive treatment effects were also observed in patients taking glucocorticoids for a broad range of rheumatologic disorders, the most common of which were rheumatoid arthritis, temporal arteritis, and polymyalgia rheumatica.

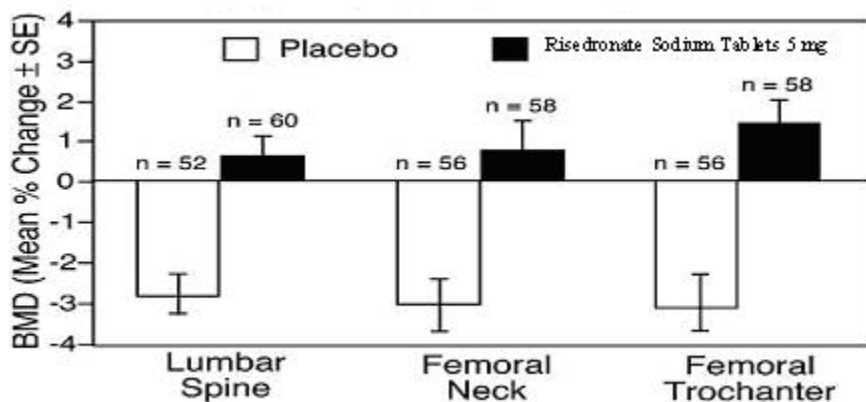


Figure 3: Change in BMD from Baseline Patients Recently Initiating Glucocorticoid Therapy

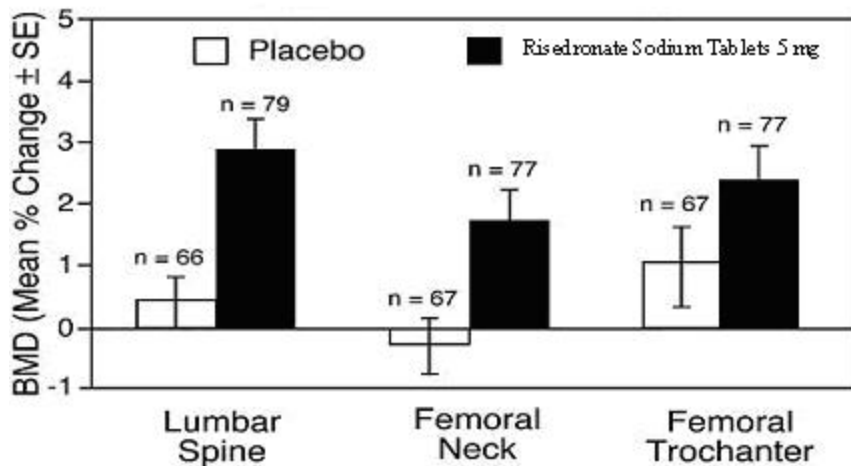


Figure 4: Change in BMD from Baseline Patients on Long-Term Glucocorticoid Therapy

Vertebral Fractures

In the prevention study of patients initiating glucocorticoids, the incidence of vertebral fractures at 1 year was reduced from 17% in the placebo group to 6% in the risedronate group. In the treatment study of patients continuing glucocorticoids, the incidence of vertebral fractures was reduced from 15% in the placebo group to 5% in the risedronate group (**Figure 5**). The statistically significant reduction in vertebral fracture incidence in the analysis of the combined studies corresponded to an absolute risk reduction of 11% and a relative risk reduction of 70%. All vertebral fractures were diagnosed radiographically; some of these fractures also were associated with symptoms (i.e., clinical fractures).

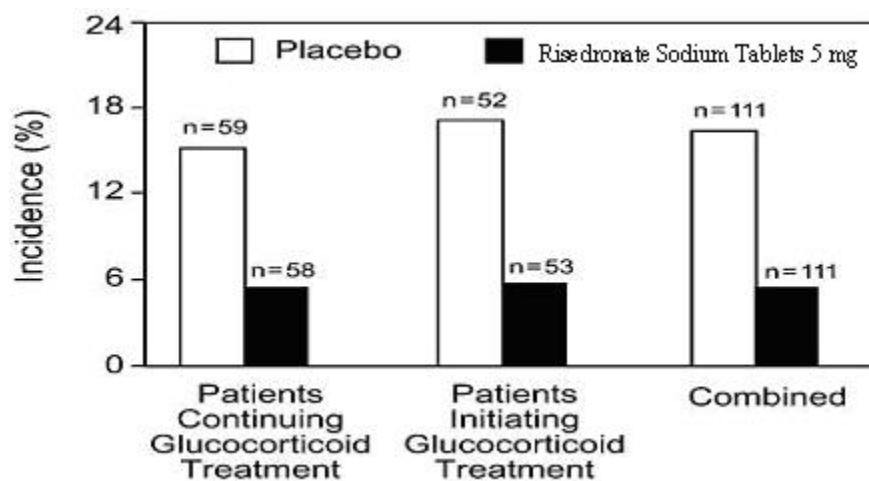


Figure 5: Incidence of Vertebral Fractures in Patients Initiating or Continuing Glucocorticoid Therapy

Histology/Histomorphometry

Bone biopsies from 40 patients on glucocorticoid therapy were obtained at endpoint. Patients had received daily risedronate sodium tablets (2.5 mg or 5 mg) or placebo for 1 year. Histologic evaluation (n = 33) showed that bone formed during treatment with risedronate was of normal lamellar structure and normal mineralization, with no bone or marrow abnormalities observed. The histomorphometric parameter mineralizing surface, a measure of bone turnover, was assessed based upon baseline and post-treatment biopsy samples from 10 patients treated with risedronate sodium tablets 5 mg. Mineralizing surface decreased 24% (median percent change) in these patients. Only a small number of placebo-treated patients had both baseline and post-treatment biopsy samples, precluding a meaningful quantitative assessment.

Treatment of Paget's Disease

The efficacy of risedronate was demonstrated in 2 clinical studies involving 120 men and 65 women. In a double-blind, active-controlled study of patients with moderate-to-severe Paget's disease (serum alkaline phosphatase levels of at least 2 times the upper limit of normal), patients were treated with risedronate sodium tablets 30 mg daily for 2 months or etidronate disodium tablets 400 mg daily for 6 months. At Day 180, 77% (43/56) of risedronate-treated patients achieved normalization of serum alkaline phosphatase levels, compared to 10.5% (6/57) of patients treated with etidronate disodium tablets ($p < 0.001$). At Day 540, 16 months after

discontinuation of therapy, 53% (17/32) of risedronate-treated patients and 14% (4/29) of etidronate disodium-treated patients with available data remained in biochemical remission.

During the first 180 days of the active-controlled study, 85% (51/60) of risedronate-treated patients demonstrated a $\geq 75\%$ reduction from baseline in serum alkaline phosphatase excess (difference between measured level and midpoint of the normal range) with 2 months of treatment compared to 20% (12/60) in the etidronate disodium-treated group with 6 months of treatment ($p < 0.001$). Changes in serum alkaline phosphatase excess over time (shown in **Figure 6**) were significant following only 30 days of treatment, with a 36% reduction in serum alkaline phosphatase excess at that time compared to only a 6% reduction seen with etidronate disodium tablet treatment at the same time point ($p < 0.01$).

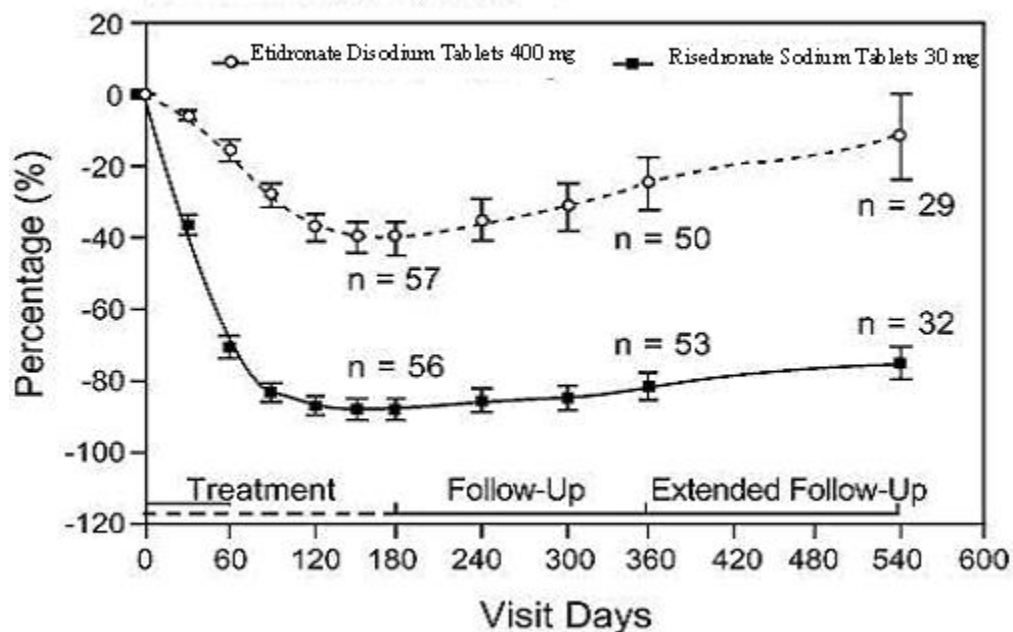


Figure 6: Mean Percent Change from Baseline in Serum Alkaline Phosphatase Excess by Visit

Response to risedronate therapy was similar in patients with mild to very severe Paget's disease. **Table 4** shows the mean percent reduction from baseline at Day 180 in excess serum alkaline phosphatase in patients with mild, moderate, or severe disease.

Table 4: Mean Percent Reduction from Baseline at Day 180 in Total Serum Alkaline Phosphatase Excess by Disease Severity

Subgroup: Baseline Disease Severity (AP)	Risedronate Sodium Tablets 30 mg			Etidronate Disodium Tablets 400 mg		
	n	Baseline Serum AP (U/L) *	Mean % Reduction	n	Baseline Serum AP (UL) *	Mean % Reduction
> 2, < 3x ULN	32	271.6 ± 5.3	-88.1	22	277.9 ± 7.45	-44.6
≥ 3, < 7x ULN	14	475.3 ± 28.8	-87.5	25	480.5 ± 26.44	-35.0
≥ 7x ULN	8	1336.5 ± 134.19	-81.8	6	1331.5 ± 167.58	-47.2

* Values shown are mean ± SEM; ULN = upper limit of normal.

Response to risedronate therapy was similar between patients who had previously received anti-pagetic therapy and those who had not. In the active-controlled study, 4 patients previously non-responsive to 1 or more courses of anti-pagetic therapy (calcitonin, etidronate disodium) responded to treatment with risedronate sodium tablets 30 mg daily (defined by at least a 30% change from baseline). Each of these patients achieved at least 90% reduction from baseline in serum alkaline phosphatase excess, with 3 patients achieving normalization of serum alkaline phosphatase levels.

Histomorphometry of the bone was studied in 14 patients with bone biopsies: 9 patients had biopsies from pagetic bone lesions and 5 patients from non-pagetic bone. Bone biopsy results in non-pagetic bone did not reveal osteomalacia, impairment of bone remodeling, or induction of a significant decline in bone turnover in patients treated with risedronate.

ANIMAL PHARMACOLOGY AND/OR TOXICOLOGY

Risedronate demonstrated potent anti-osteoclast, antiresorptive activity in ovariectomized rats and minipigs. Bone mass and biomechanical strength were increased dose-dependently at oral doses up to 4 and 25 times the human recommended oral dose of 5 mg based on surface area, (mg/m^2) for rats and minipigs, respectively. Risedronate treatment maintained the positive correlation between BMD and bone strength and did not have a negative effect on bone structure or mineralization. In intact dogs, risedronate

induced positive bone balance at the level of the bone remodeling unit at oral doses ranging from 0.35 to 1.4 times the human daily dose of 5 mg based on surface area (mg/m^2).

In dogs treated with an oral dose of 1 mg/kg/day (approximately 5 times the human daily dose of 5 mg based on surface area, mg/m^2), risedronate caused a delay in fracture healing of the radius. The observed delay in fracture healing is similar to other bisphosphonates. This effect did not occur at a dose of 0.1 mg/kg/day (approximately 0.5 times the human daily dose of 5 mg based on surface area, mg/m^2).

The Schenk rat assay, based on histologic examination of the epiphyses of growing rats after drug treatment, demonstrated that risedronate did not interfere with bone mineralization even at the highest dose tested (5 mg/kg/day, subcutaneously), which was approximately 3500 times the lowest antiresorptive dose (1.5 mcg/kg/day) and approximately 800 times the human daily dose of 5 mg based on surface area (mg/m^2). This indicates that risedronate administered at the therapeutic dose is unlikely to induce osteomalacia.

INDICATIONS AND USAGE

Postmenopausal Osteoporosis

Risedronate sodium tablets are indicated for the treatment and prevention of osteoporosis in postmenopausal women.

Treatment of Osteoporosis

In postmenopausal women with osteoporosis, risedronate sodium tablets increase BMD and reduce the incidence of vertebral fractures and a composite endpoint of nonvertebral osteoporosis-related fractures (see **CLINICAL STUDIES**). Osteoporosis may be confirmed by the presence or history of osteoporotic fracture, or by the finding of low bone mass (for example, at least 2 SD below the premenopausal mean).

Prevention of Osteoporosis

Risedronate sodium tablets may be considered in postmenopausal women who are at risk of developing osteoporosis and for whom the desired clinical outcome is to maintain bone mass and to reduce the risk of fracture.

Factors such as family history of osteoporosis, previous fracture, smoking, BMD (at least 1 SD below the premenopausal mean), high bone turnover, thin body frame, Caucasian or Asian race, and early menopause are associated with an increased risk of developing osteoporosis and fractures. The presence of these risk factors may be important when considering the use of risedronate sodium tablets for prevention of osteoporosis.

Glucocorticoid-Induced Osteoporosis

Risedronate sodium tablets are indicated for the prevention and treatment of glucocorticoid-induced osteoporosis in men and women who are either initiating or continuing systemic glucocorticoid treatment (daily dosage equivalent to 7.5 mg or greater of prednisone) for chronic diseases. Patients treated with glucocorticoids should receive adequate amounts of calcium and vitamin D.

Paget's Disease

Risedronate sodium tablets are indicated for treatment of Paget's disease of bone in men and women. Treatment is indicated in patients with Paget's disease of bone (1) who have a level of serum alkaline phosphatase at least 2 times the upper limit of normal, or (2) who are symptomatic, or (3) who are at risk for future complications from their disease, to induce remission (normalization of serum alkaline phosphatase).

CONTRAINDICATIONS

- Hypocalcemia (see **PRECAUTIONS, Mineral Metabolism**)
- Known hypersensitivity to any component of this product
- Inability to stand or sit upright for at least 30 minutes

WARNINGS

Bisphosphonates may cause upper gastrointestinal disorders such as dysphagia, esophagitis, and esophageal or gastric ulcer (see **PRECAUTIONS**).

PRECAUTIONS

Mineral Metabolism

Hypocalcemia and other disturbances of bone and mineral metabolism should be effectively treated before starting risedronate therapy. Adequate intake of calcium and vitamin D is important in all patients, especially in patients with Paget's disease in whom bone turnover is significantly elevated. Risedronate is not recommended for use in patients with severe renal impairment (creatinine clearance $< 30 \text{ mL}/\text{min}$).

Upper Gastrointestinal Effects

Bisphosphonates have been associated with gastrointestinal disorders such as dysphagia, esophagitis, and esophageal or gastric ulcers. This association has been reported for bisphosphonates in postmarketing experience, but has not been found in most pre-approval clinical trials, including those conducted with risedronate. Patients should be advised that taking the medication according to the instructions is important to minimize the risk of these events. They should take risedronate with sufficient plain water (6 to 8 oz) to facilitate delivery to the stomach, and should not lie down for 30 minutes after taking the drug.

Jaw Osteonecrosis

Osteonecrosis, primarily in the jaw, has been reported in patients treated with bisphosphonates. Most cases have been in cancer patients undergoing dental procedures such as tooth extraction, but some have occurred in patients with postmenopausal osteoporosis or other diagnoses. Most reported cases have been in patients treated with bisphosphonates intravenously but some have been in patients treated orally.

For patients requiring dental procedures, there are no data available to suggest whether discontinuation of bisphosphonate treatment, prior to the procedure, reduces the risk of osteonecrosis of the jaw. Clinical judgment should guide the management plan of each patient based on individual benefit/risk assessment.

Musculoskeletal Pain

In postmarketing experience, there have been infrequent reports of severe and occasionally incapacitating bone, joint, and/or muscle pain in patients taking bisphosphonates (see **ADVERSE REACTIONS**). The time to onset of symptoms varied from one day to several months after starting the drug. Most patients had relief of symptoms after stopping medication. A subset had recurrence of symptoms when rechallenged with the same drug or another bisphosphonate.

Glucocorticoid-Induced Osteoporosis

The risk versus benefit of risedronate for the prevention and treatment of glucocorticoid-induced osteoporosis at daily doses of glucocorticoids < 7.5 mg of prednisone or equivalent has not been established. Before initiating treatment, the hormonal status of both men and women should be ascertained and appropriate replacement considered.

The efficacy of risedronate for this indication has been established in studies of 1 year duration. The efficacy of risedronate beyond 1 year has not been studied.

Information for Patients

The patient should be informed to pay particular attention to the dosing instructions as clinical benefits may be compromised by failure to take the drug according to instructions. Specifically, risedronate should be taken at least 30 minutes before the first food or drink of the day other than water.

To facilitate delivery to the stomach, and thus reduce the potential for esophageal irritation, patients should take risedronate while in an upright position (sitting or standing) with a full glass of plain water (6 to 8 oz). Patients should not lie down for 30 minutes after taking the medication (see **PRECAUTIONS, Upper Gastrointestinal Effects**). Patients should not chew or suck on the tablet because of a potential for oropharyngeal irritation.

Patients should be instructed that if they develop symptoms of esophageal disease (such as difficulty or pain upon swallowing, retrosternal pain or severe persistent or worsening heartburn) they should consult their physician before continuing risedronate. Patients should be instructed that if they miss a dose of risedronate sodium tablets 35 mg once a week, they should take 1 tablet on the morning after they remember and return to taking 1 tablet once a week, as originally scheduled on their chosen day. Patients should not take 2 tablets on the same day.

Patients should receive supplemental calcium and vitamin D if dietary intake is inadequate (see **PRECAUTIONS, Mineral Metabolism**). Calcium supplements or calcium-, aluminum-, and magnesium-containing medications may interfere with the absorption of risedronate and should be taken at a different time of the day, as with food.

Weight-bearing exercise should be considered along with the modification of certain behavioral factors, such as excessive cigarette smoking, and/or alcohol consumption, if these factors exist.

Physicians should instruct their patients to read the Patient Information before starting therapy with risedronate sodium tablets 5 mg or 35 mg and to re-read it each time the prescription is renewed.

Patients should be reminded to give all of their health care providers an accurate medication history. Instruct patients to tell all of their health care providers that they are taking risedronate. Patients should be instructed that any time they have a medical problem they think may be from risedronate, they should talk to their doctor.

Drug Interactions

No specific drug-drug interaction studies were performed. Risedronate is not metabolized and does not induce or inhibit hepatic microsomal drug-metabolizing enzymes (Cytochrome P450).

Calcium Supplements/Antacids

Coadministration of risedronate and calcium, antacids, or oral medications containing divalent cations will interfere with the absorption of risedronate.

Hormone Replacement Therapy

One study of about 500 early postmenopausal women has been conducted to date in which treatment with risedronate sodium tablets (5 mg daily) plus estrogen replacement therapy was compared to estrogen replacement therapy alone. Exposure to study drugs was approximately 12 to 18 months and the primary endpoint was change in BMD. If considered appropriate, risedronate may be used concomitantly with hormone replacement therapy.

Aspirin/Non-steroidal Anti-Inflammatory Drugs (NSAIDs)

Of over 5700 patients enrolled in the Risedronate Phase 3 osteoporosis studies, aspirin use was reported by 31% of patients, 24% of whom were regular users (3 or more days per week). Forty-eight percent of patients reported NSAID use, 21% of whom were regular users. Among regular aspirin or NSAID users, the incidence of upper gastrointestinal adverse experiences in risedronate-treated patients (24.5%) was similar to that in placebo-treated patients (24.8%).

H₂ Blockers and Proton Pump Inhibitors (PPIs)

Of over 5700 patients enrolled in the Risedronate Phase 3 osteoporosis studies, 21% used H₂ blockers and/or PPIs. Among these patients, the incidence of upper gastrointestinal adverse experiences in the risedronate-treated patients was similar to that in placebo-treated patients.

Drug/Laboratory Test Interactions

Bisphosphonates are known to interfere with the use of bone-imaging agents. Specific studies with risedronate have not been performed.

Carcinogenesis, Mutagenesis, Impairment of Fertility

Carcinogenesis

In a 104 week carcinogenicity study, rats were administered daily oral doses up to 24 mg/kg/day (approximately 7.7 times the maximum recommended human daily dose of 30 mg based on surface area, mg/m²). There were no significant drug-induced tumor findings in male or female rats. The high dose male group of 24 mg/kg/day was terminated early in the study (Week 93) due to excessive toxicity, and data from this group were not included in the statistical evaluation of the study results. In an 80 week carcinogenicity study, mice were administered daily oral doses up to 32 mg/kg/day (approximately 6.4 times the 30 mg/day human dose based on surface area, mg/m²). There were no significant drug-induced tumor findings in male or female mice.

Mutagenesis

Risedronate did not exhibit genetic toxicity in the following assays: *in vitro* bacterial mutagenesis in *Salmonella* and *E. coli* (Ames assay), mammalian cell mutagenesis in CHO/HGPRT assay, unscheduled DNA synthesis in rat hepatocytes and an assessment of chromosomal aberrations *in vivo* in rat bone marrow. Risedronate was positive in a chromosomal aberration assay in CHO cells at highly cytotoxic concentrations (> 675 mcg/mL, survival of 6% to 7%). When the assay was repeated at doses exhibiting appropriate cell survival (29%), there was no evidence of chromosomal damage.

Impairment of Fertility

In female rats, ovulation was inhibited at an oral dose of 16 mg/kg/day (approximately 5.2 times the 30 mg/day human dose based on surface area, mg/m²). Decreased implantation was noted in female rats treated with doses \geq 7 mg/kg/day (approximately 2.3 times the 30 mg/day human dose based on surface area, mg/m²). In male rats, testicular and epididymal atrophy and inflammation were noted at 40 mg/kg/day (approximately 13 times the 30 mg/day human dose based on surface area, mg/m²). Testicular atrophy was also noted in male rats after 13 weeks of treatment at oral doses of 16 mg/kg/day (approximately 5.2 times the 30 mg/day human dose based on surface area, mg/m²). There was moderate-to-severe spermatid maturation block after 13 weeks in male dogs at an oral dose of 8 mg/kg/day (approximately 8 times the 30 mg/day human dose based on surface area, mg/m²). These findings tended to increase in severity with increased dose and exposure time.

Pregnancy

Teratogenic Effects

Pregnancy category C

Survival of neonates was decreased in rats treated during gestation with oral doses \geq 16 mg/kg/day (approximately 5.2 times the 30 mg/day human dose based on surface area, mg/m²). Body weight was decreased in neonates from dams treated with 80 mg/kg (approximately 26 times the 30 mg/day human dose based on surface area, mg/m²). In rats treated during gestation, the number of fetuses exhibiting incomplete ossification of sternebrae or skull was statistically significantly increased at 7.1 mg/kg/day (approximately 2.3 times the 30 mg/day human dose based on surface area, mg/m²). Both incomplete ossification and unossified

sternbrae were increased in rats treated with oral doses ≥ 16 mg/kg/day (approximately 5.2 times the 30 mg/day human dose based on surface area, mg/m^2). A low incidence of cleft palate was observed in fetuses from female rats treated with oral doses ≥ 3.2 mg/kg/day (approximately 1 time the 30 mg/day human dose based on surface area, mg/m^2). The relevance of this finding to human use of risedronate is unclear. No significant fetal ossification effects were seen in rabbits treated with oral doses up to 10 mg/kg/day during gestation (approximately 6.7 times the 30 mg/day human dose based on surface area, mg/m^2). However, in rabbits treated with 10 mg/kg/day, 1 of 14 litters were aborted and 1 of 14 litters were delivered prematurely.

Similar to other bisphosphonates, treatment during mating and gestation with doses as low as 3.2 mg/kg/day (approximately 1 time the 30 mg/day human dose based on surface area, mg/m^2) has resulted in periparturient hypocalcemia and mortality in pregnant rats allowed to deliver.

Bisphosphonates are incorporated into the bone matrix, from which they are gradually released over periods of weeks to years. The amount of bisphosphonate incorporation into adult bone, and hence, the amount available for release back into the systemic circulation, is directly related to the dose and duration of bisphosphonate use. There are no data on fetal risk in humans. However, there is a theoretical risk of fetal harm, predominantly skeletal, if a woman becomes pregnant after completing a course of bisphosphonate therapy. The impact of variables such as time between cessation of bisphosphonate therapy to conception, the particular bisphosphonate used, and the route of administration (intravenous versus oral) on this risk has not been studied.

There are no adequate and well-controlled studies of risedronate in pregnant women. Risedronate should be used during pregnancy only if the potential benefit justifies the potential risk to the mother and fetus.

Nursing Women

Risedronate was detected in feeding pups exposed to lactating rats for a 24 hour period post-dosing, indicating a small degree of lacteal transfer. It is not known whether risedronate is excreted in human milk. Because many drugs are excreted in human milk and because of the potential for serious adverse reactions in nursing infants from bisphosphonates, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.

Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

Geriatric Use

Of the patients receiving risedronate in postmenopausal osteoporosis studies (see **CLINICAL STUDIES**), 47% were between 65 and 75 years of age, and 17% were over 75. The corresponding proportions were 26% and 11% in glucocorticoid-induced osteoporosis trials, and 40% and 26% in Paget's disease trials. No overall differences in efficacy between geriatric and younger patients were observed in these studies. No overall differences in safety between geriatric and younger patients were observed in the risedronate trials, but greater sensitivity of some older individuals cannot be ruled out.

ADVERSE REACTIONS

Daily Dosing

Osteoporosis

Risedronate has been studied in over 5700 patients enrolled in the Phase 3 glucocorticoid-induced osteoporosis clinical trials and in postmenopausal osteoporosis trials of up to 3 years duration. The overall adverse event profile of risedronate sodium tablets 5 mg in these studies was similar to that of placebo. Most adverse events were either mild or moderate and did not lead to discontinuation from the study. The incidence of serious adverse events in the placebo group was 24.9% and in the risedronate sodium tablets 5 mg group was 26.3%. The percentage of patients who withdrew from the study due to adverse events was 14.4% and 13.5% for the placebo and risedronate sodium tablets 5 mg groups, respectively. **Table 5** lists adverse events from the Phase 3 osteoporosis trials reported in $\geq 2\%$ of patients and in more risedronate-treated patients than placebo-treated patients. Adverse events are shown without attribution of causality.

Table 5: Adverse Events Occurring at a Frequency $\geq 2\%$ and in More Risedronate-Treated Patients than Placebo-Treated Patients; Combined Phase 3 Osteoporosis Trials

Body System	Placebo % (N = 1914)	Risedronate Sodium Tablets 5 mg % (N = 1916)
Body as Whole		
Infection	29.7	29.9
Back Pain	23.6	26.1
Pain	13.1	13.6

Abdominal Pain	9.4	11.6
Neck Pain	4.5	5.3
Asthenia	4.3	5.1
Chest Pain	4.9	5.0
Neoplasm	3.0	3.3
Hernia	2.5	2.9
Cardiovascular		
Hypertension	9.0	10.0
Cardiovascular Disorder	1.7	2.5
Angina Pectoris	2.4	2.5
Digestive		
Nausea	10.7	10.9
Diarrhea	9.6	10.6
Flatulence	4.2	4.6
Gastritis	2.3	2.5
Gastrointestinal Disorder	2.1	2.3
Rectal Disorder	1.9	2.2
Tooth Disorder	2.0	2.1
Hemic and Lymphatic		
Ecchymosis	4.0	4.3
Anemia	1.9	2.4
Musculoskeletal		
Arthralgia	21.1	23.7
Joint Disorder	5.4	6.8
Myalgia	6.3	6.6
Bone Pain	4.3	4.6
Bone Disorder	3.2	4.0
Leg Cramps	2.6	3.5
Bursitis	2.9	3.0
Tendon Disorder	2.5	3.0
Nervous		
Depression	6.2	6.8
Dizziness	5.4	6.4
Insomnia	4.5	4.7
Anxiety	3.0	4.3
Neuralgia	3.5	3.8
Vertigo	3.2	3.3
Hypertonia	2.1	2.2
Paresthesia	1.8	2.1
Respiratory		
Pharyngitis	5.0	5.8
Rhinitis	5.0	5.7
Dyspnea	3.2	3.8
Pneumonia	2.6	3.1
Skin and Appendages		
Rash	7.2	7.7
Pruritus	2.2	3.0
Skin Carcinoma	1.8	2.0

Special Senses		
Cataract	5.4	5.9
Conjunctivitis	2.8	3.1
Otitis Media	2.4	2.5
Urogenital		
Urinary Tract Infection	9.7	10.9
Cystitis	3.5	4.1

Duodenitis and glossitis have been reported uncommonly (0.1% to 1%). There have been rare reports (< 0.1%) of abnormal liver function tests.

Laboratory Test Findings

Throughout the Phase 3 studies, transient decreases from baseline in serum calcium (< 1%) and serum phosphate (< 3%) and compensatory increases in serum PTH levels (< 30%) were observed within 6 months in patients in osteoporosis clinical trials treated with risedronate sodium tablets 5 mg once daily. There were no significant differences in serum calcium, phosphate, or PTH levels between risedronate sodium tablets 5 mg once daily and placebo at 3 years. Serum calcium levels below 8 mg/dL were observed in 18 patients, 9 (0.5%) in each treatment arm (risedronate sodium tablets 5 mg once daily and placebo). Serum phosphorus levels below 2 mg/dL were observed in 14 patients, 11 (0.6%) treated with risedronate sodium tablets 5 mg once daily and 3 (0.2%) treated with placebo.

Endoscopic Findings

Risedronate clinical studies enrolled over 5700 patients, many with preexisting gastrointestinal disease and concomitant use of NSAIDs or aspirin. Investigators were encouraged to perform endoscopies in any patients with moderate-to-severe gastrointestinal complaints, while maintaining the blind. These endoscopies were ultimately performed on equal numbers of patients between the treated and placebo groups [75 (14.5%) placebo; 75 (11.9%) risedronate]. Across treatment groups, the percentage of patients with normal esophageal, gastric, and duodenal mucosa on endoscopy was similar (20% placebo, 21% risedronate). The number of patients who withdrew from the studies due to the event prompting endoscopy was similar across treatment groups. Positive findings on endoscopy were also generally comparable across treatment groups. There was a higher number of reports of mild duodenitis in the risedronate group, however there were more duodenal ulcers in the placebo group. Clinically important findings (perforations, ulcers, or bleeding) among this symptomatic population were similar between groups (51% placebo; 39% risedronate).

Once-A-Week Dosing

In a 1 year, double-blind, multicenter study comparing risedronate sodium tablets 5 mg daily and risedronate sodium tablets 35 mg once a week in postmenopausal women, the overall safety and tolerability profiles of the 2 oral dosing regimens were similar. **Table 6** lists the adverse events in $\geq 2\%$ of patients from this trial. Events are shown without attribution of causality.

Table 6: Adverse Events Occurring in $\geq 2\%$ of Patients of Either Treatment Group in the Daily vs. Weekly Osteoporosis Treatment Study in Postmenopausal Women

Body System	5 mg Daily Risedronate Sodium Tablets % (N = 480)	35 mg Weekly Risedronate Sodium Tablets % (N = 485)
Body as Whole		
Infection	19.0	20.6
Accidental Injury	10.6	10.7
Pain	7.7	9.9
Back Pain	9.2	8.7
Flu Syndrome	7.1	8.5
Abdominal Pain	7.3	7.6
Headache	7.3	7.2
Overdose	6.9	6.8
Asthenia	3.5	5.4
Chest Pain	2.3	2.7
Allergic Reaction	1.9	2.5
Neoplasm	0.8	2.1
Neck Pain	2.7	1.2
Cardiovascular System		

Hypertension	5.8	4.9
Syncope	0.6	2.1
Vasodilatation	2.3	1.4
Digestive System		
Constipation	12.5	12.2
Dyspepsia	6.9	7.6
Nausea	8.5	6.2
Diarrhea	6.3	4.9
Gastroenteritis	3.8	3.5
Flatulence	3.3	3.1
Colitis	0.8	2.5
Gastrointestinal Disorder	1.9	2.5
Vomiting	1.9	2.5
Dry Mouth	2.5	1.4
Metabolic and Nutritional Disorders		
Peripheral Edema	4.2	1.6
Musculoskeletal System		
Arthralgia	11.5	14.2
Traumatic Bone Fracture	5.0	6.4
Myalgia	4.6	6.2
Arthritis	4.8	4.1
Bursitis	1.3	2.5
Bone Pain	2.9	1.4
Nervous System		
Dizziness	5.8	4.9
Anxiety	0.6	2.7
Depression	2.3	2.3
Vertigo	2.1	1.6
Respiratory System		
Bronchitis	2.3	4.9
Sinusitis	4.6	4.5
Pharyngitis	4.6	2.9
Cough Increased	3.1	2.5
Pneumonia	0.8	2.5
Rhinitis	2.3	2.1
Skin and Appendages		
Rash	3.1	4.1
Pruritus	1.9	2.3
Special Senses		
Cataract	2.9	1.9
Urogenital System		
Urinary Tract Infection	2.9	5.2

Laboratory Test Findings

In a 1 year study comparing daily versus weekly oral dosing regimens of risedronate sodium tablets in postmenopausal women, the mean percent changes from baseline at 12 months were similar between the risedronate sodium tablets 5 mg daily and risedronate sodium tablets 35 mg once a week groups, respectively, for serum calcium (0.4% and 0.7%), phosphate (- 3.8% and - 2.6%) and PTH (6.4% and 4.2%).

Paget's Disease

Risedronate has been studied in 392 patients with Paget's disease of bone. As in trials of risedronate for other indications, the adverse experiences reported in the Paget's disease trials have generally been mild or moderate, have not required discontinuation of treatment, and have not appeared to be related to patient age, gender, or race.

In a double-blind, active-controlled study, the adverse event profile was similar for risedronate and etidronate disodium: 6.6% (4/61) of patients treated with risedronate sodium tablets 30 mg daily for 2 months discontinued treatment due to adverse events, compared to 8.2% (5/61) of patients treated with etidronate disodium tablets 400 mg daily for 6 months.

Table 7: Adverse Events Reported in $\geq 2\%$ of Risedronate-Treated Patients*in Phase 3 Paget's Disease Trials

Body System	30 mg/day times 2 months Risedronate Sodium Tablets % (n = 61)	400 mg/day times 6 months Etidronate Disodium Tablets % (n = 61)
Body as Whole		
Flu Syndrome	9.8	1.6
Chest Pain	6.6	3.3
Asthenia	4.9	0.0
Neoplasm	3.3	1.6
Gastrointestinal		
Diarrhea	19.7	14.8
Abdominal Pain	11.5	8.2
Nausea	9.8	9.8
Constipation	6.6	8.2
Belching	3.3	1.6
Colitis	3.3	3.3
Metabolic and Nutritional Disorders		
Peripheral Edema	8.2	6.6
Musculoskeletal		
Arthralgia	32.8	29.5
Bone Pain	4.9	4.9
Leg Cramps	3.3	3.3
Myasthenia	3.3	0.0
Nervous		
Headache	18.0	16.4
Dizziness	6.6	4.9
Respiratory		
Bronchitis	3.3	4.9
Sinusitis	4.9	1.6
Skin and Appendages		
Rash	11.5	8.2
Special Senses		
Amblyopia	3.3	3.3
Tinnitus	3.3	3.3
Dry Eye	3.3	0.0

* Considered to be possibly or probably causally related in at least one patient.

Ocular Adverse Events

Three patients who received risedronate sodium tablets 30 mg daily experienced acute iritis in 1 supportive study. All 3 patients recovered from their events; however, in 1 of these patients, the event recurred during risedronate treatment and again during treatment with pamidronate. All patients were effectively treated with topical steroids.

Postmarketing Experience

Very rare hypersensitivity and skin reactions have been reported, including angioedema, generalized rash and bullous skin reactions, some severe.

Musculoskeletal: bone, joint, or muscle pain, rarely described as severe or incapacitating (see **PRECAUTIONS, Musculoskeletal Pain**).

Very rare reactions of eye inflammation including iritis and uveitis have been reported.

Osteonecrosis of the jaw has been reported very rarely (see **PRECAUTIONS, Jaw Osteonecrosis**).

OVERDOSAGE

Decreases in serum calcium and phosphorus following substantial overdose may be expected in some patients. Signs and symptoms of hypocalcemia may also occur in some of these patients. Milk or antacids containing calcium should be given to bind risedronate and reduce absorption of the drug.

In cases of substantial overdose, gastric lavage may be considered to remove unabsorbed drug. Standard procedures that are effective for treating hypocalcemia, including the administration of calcium intravenously, would be expected to restore physiologic amounts of ionized calcium and to relieve signs and symptoms of hypocalcemia.

Lethality after single oral doses was seen in female rats at 903 mg/kg and male rats at 1703 mg/kg. The minimum lethal dose in mice and rabbits was 4000 mg/kg and 1000 mg/kg. These values represent 320 to 620 times the 30 mg human dose based on surface area (mg/m²).

DOSAGE AND ADMINISTRATION

Risedronate sodium tablets should be taken at least 30 minutes before the first food or drink of the day other than water.

To facilitate delivery to the stomach, risedronate sodium tablets should be swallowed while the patient is in an upright position and with a full glass of plain water (6 to 8 oz). Patients should not lie down for 30 minutes after taking the medication (see

PRECAUTIONS, Upper Gastrointestinal Effects).

Patients should receive supplemental calcium and vitamin D if dietary intake is inadequate (see **PRECAUTIONS, Mineral Metabolism**). Calcium supplements and calcium-, aluminum-, and magnesium-containing medications may interfere with the absorption of risedronate and should be taken at a different time of the day. Risedronate sodium tablets are not recommended for use in patients with severe renal impairment (creatinine clearance < 30 mL/min). No dosage adjustment is necessary in patients with a creatinine clearance ≥ 30 mL/min or in the elderly.

Treatment of Postmenopausal Osteoporosis (see INDICATIONS AND USAGE)

The recommended regimen is:

- one 5 mg tablet orally, taken daily

or

- one 35 mg tablet orally, taken once a week

Prevention of Postmenopausal Osteoporosis (see INDICATIONS AND USAGE)

The recommended regimen is:

- one 5 mg tablet orally, taken daily

or

- one 35 mg tablet orally, taken once a week

Treatment and Prevention of Glucocorticoid-Induced Osteoporosis (see INDICATIONS AND USAGE)

The recommended regimen is:

- one 5 mg tablet orally, taken daily

Paget's Disease (see INDICATIONS AND USAGE)

The recommended treatment regimen is 30 mg orally once daily for 2 months. Retreatment may be considered (following post-treatment observation of at least 2 months) if relapse occurs, or if treatment fails to normalize serum alkaline phosphatase. For retreatment, the dose and duration of therapy are the same as for initial treatment. No data are available on more than 1 course of retreatment.

HOW SUPPLIED

Risedronate sodium tablets are available as:

5 mg: yellow, round, standard convex coated tablets, debossed with “93” on one side and “7390” on the other side, in bottles of 30, 100, and 1000.

30 mg: white, round, standard convex coated tablets, debossed with “93” on one side and “7391” on the other side, in bottles of 30, 100, and 1000.

35 mg: orange, round, standard convex coated tablets, debossed with “93” on one side and “7389” on the other side, in bottles of 1000 and in blister package of 4 x 1 card in a carton.

Store at 20° to 25°C (68° to 77°F) [See USP Controlled Room Temperature].

Dispense in a tight, light-resistant container as defined in the USP, with a child-resistant closure (as required).

PATIENT INFORMATION ABOUT RISEDRONATE SODIUM TABLETS

Risedronate Sodium Tablets 5 mg and Risedronate Sodium Tablets 35 mg for Osteoporosis

Read this information carefully before you start to use your medicine. Read the information you get every time you get more medicine. There may be new information. This information does not take the place of talking with your health care provider about your medical condition or your treatment. If you have any questions or are not sure about something, ask your health care provider or pharmacist.

What is the most important information I should know about risedronate sodium tablets?

Risedronate sodium tablets may cause problems in your stomach and esophagus (the tube that connects the mouth and the stomach), such as trouble swallowing (dysphagia), heartburn (esophagitis), and ulcers. You might feel pain in your bones, joints, or muscles (see “What are the possible side effects of risedronate sodium tablets?”).

You must follow the instructions exactly for risedronate sodium tablets to work and to lower the chance of serious side effects (see “How should I take risedronate sodium tablets?”).

What are risedronate sodium tablets?

Risedronate sodium tablets are a prescription medicine used:

- to prevent and treat osteoporosis in postmenopausal women (see “What is osteoporosis?”).
- to prevent and treat osteoporosis in men and women that is caused by treatment with steroid medicines such as prednisone.
- to treat Paget’s disease of bone in men and women. The treatment for Paget’s disease is very different than for osteoporosis and uses a different type of risedronate sodium tablets. This leaflet does not cover using risedronate sodium tablets for Paget’s disease. If you have Paget’s disease, ask your health care provider how to use risedronate sodium tablets.

Risedronate sodium tablets may reverse bone loss by stopping more loss of bone and increasing bone strength in most people who take them, even though they won’t be able to see or feel a difference. Risedronate sodium tablets help lower the risk of breaking bones (fractures). Your health care provider may measure the thickness (density) of your bones or do other tests to check your progress.

See the end of this leaflet for information about osteoporosis.

Who should not take risedronate sodium tablets?

Do not take risedronate sodium tablets if you:

- have low blood calcium (hypocalcemia)
- cannot sit or stand up for 30 minutes
- have kidneys that work poorly
- have an allergy to risedronate. The active ingredient in risedronate sodium tablets is risedronate sodium (see the end of this leaflet for a list of all the ingredients in risedronate sodium tablets).

Tell your doctor before using risedronate sodium tablets if:

- you are pregnant or may become pregnant. We do not know if risedronate sodium tablets can harm your unborn child.
- you are breast-feeding or plan to breast-feed. We do not know if risedronate can pass through your milk and if it can harm your baby.
- you have kidney problems. Risedronate sodium tablets may not be right for you.

Tell your doctor about all the medicines you take, including prescription and non-prescription medicines, vitamins and herbal supplements. Risedronate sodium tablets can interact with other medicines. Keep a list of all the medicines you take. Show it to all your health care providers, including your dentist and pharmacist, each time you get a new medicine.

How should I take risedronate sodium tablets?

The following instructions are for both risedronate sodium tablets 5 mg (daily) and risedronate sodium tablets 35 mg (Once-A-Week):

- Take risedronate sodium tablets first thing in the morning before you eat or drink anything except plain water.
- Take risedronate sodium tablets while you are sitting up or standing.
- Take risedronate sodium tablets with 6 to 8 ounces (about 1 cup) of plain water. Do **not** take them with any other drink besides plain water. Do not take them with coffee, tea, juice, milk, or other dairy drinks.
- Swallow risedronate sodium tablets whole. **Do not chew** the tablet or keep it in your mouth to melt or dissolve.

- After taking risedronate sodium tablets you must wait at least 30 minutes **BEFORE:**
- lying down. You may sit, stand, or do normal activities like read the newspaper or take a walk.
- eating or drinking anything except plain water.
- taking vitamins, calcium, or antacids. Take vitamins, calcium, and antacids at a different time of the day from when you take risedronate sodium tablets.
- Keep taking risedronate sodium tablets for as long as your health care provider tells you.
- For risedronate sodium tablets to treat your osteoporosis or keep you from getting osteoporosis, you have to take them exactly as prescribed.
- Your health care provider may tell you to take calcium and vitamin D supplements and to exercise.

What is my risedronate sodium tablets schedule?

If your doctor has prescribed **risedronate sodium tablets 5 mg daily (a yellow tablet):**

- Take 1 risedronate sodium tablet 5 mg every day in the morning.
- If you miss a dose of your risedronate sodium tablet 5 mg in the morning, do **not** take it later in the day. Take only 1 risedronate sodium tablet, 5 mg the next morning and continue your usual schedule of 1 tablet a day. Do **not** take 2 tablets on the same day.

If your doctor has prescribed **risedronate sodium tablets 35 mg Once-A-Week (an orange tablet):**

- Choose 1 day of the week that you will remember and that best fits your schedule to take your risedronate sodium tablet 35 mg. Every week, take 1 risedronate sodium tablet 35 mg in the morning on your chosen day.
- If you miss a dose of your risedronate sodium tablet 35 mg in the morning, do **not** take it later in the day. Take only 1 risedronate sodium tablet 35 mg the next morning and continue your usual schedule of 1 tablet on your chosen day of the week. Do **not** take 2 tablets on the same day.

What should I avoid while taking risedronate sodium tablets?

- Do not eat or drink anything except water before you take risedronate sodium tablets and for at least 30 minutes after you take them.
- Do not lie down for at least 30 minutes after you take risedronate sodium tablets.
- Foods and some vitamin supplements and medicines can stop your body from absorbing (using) risedronate. Therefore, do not take anything other than plain water at or near the time you take risedronate sodium tablets. (See “**How should I take risedronate sodium tablets?**”).

What are the possible side effects of risedronate sodium tablets?

Stop taking risedronate sodium tablets and tell your health care provider right away if:

- **swallowing is difficult or painful**
- **you have chest pain**
- **you have very bad heartburn or it doesn't get better**

Risedronate sodium tablets may cause:

- pain or trouble swallowing (dysphagia)
- heartburn (esophagitis)
- ulcers in your stomach and esophagus (the tube that connects the mouth and the stomach)
- pain in bones, joints or muscles, sometimes severe. Pain may start as soon as one day or up to several months after starting risedronate sodium tablets.

The most common side effects with risedronate sodium tablets include back pain, joint pain, upset stomach, abdominal (stomach area) pain, constipation, diarrhea, gas, and headache. Tell your health care provider if you have pain or discomfort in your stomach or esophagus. Rarely, severe skin reactions may occur. Patients may get allergic reactions such as rash, hives, or in rare cases, swelling that can be of the face, lips, tongue, or throat, which may cause trouble breathing or swallowing.

In rare cases, patients taking risedronate sodium tablets may get eye inflammation, usually with pain, redness and sensitivity to light. Rarely, patients had jaw problems associated with delayed healing and infection, often following tooth extraction.

These are not all the possible side effects of risedronate sodium tablets. You can ask your health care provider or pharmacist about other side effects. Any time you have a medical problem you think may be from risedronate, talk to your doctor.

What is osteoporosis?

Osteoporosis is a disease that causes bones to become thinner. Thin bones can break easily. Most people think of their bones as being solid like a rock. Actually, bone is living tissue, just like other parts of the body—your heart, brain, or skin, for example. Bone just happens to be a harder type of tissue. Bone is always changing. Your body keeps your bones strong and healthy by replacing old bone with new bone.

Osteoporosis causes the body to remove more bone than it replaces. This means that bones get weaker. Weak bones are more likely to break. Osteoporosis is a bone disease that is quite common, especially in older women. However, young people and men can develop osteoporosis, too. Osteoporosis can be prevented, and with proper therapy it can be treated.

How can osteoporosis affect me?

- You may not have any pain or other symptoms when osteoporosis begins.
- You are more likely to break (fracture) a bone especially if you fall because osteoporosis makes your bones weaker. You are most likely to break a bone in your back (spine), wrist, or hip.
- You may “shrink” (get shorter).
- You may get a “hump” (curve) in your back.
- You may have bad back pain that makes you stop some activities.

Who is at risk for osteoporosis?

Many things put people at risk for osteoporosis. The following people have a higher chance of getting osteoporosis:

Women who

- are going through or who are past menopause (“the change”)
- are white (Caucasian) or Asian

People who

- are thin
- have a family member with osteoporosis
- do not get enough calcium or vitamin D
- do not exercise
- smoke
- drink alcohol often
- take bone thinning medicines (like prednisone or other corticosteroids) for a long time

General information about risedronate sodium tablets:

Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use risedronate sodium tablets for a condition for which they were not prescribed. Do not give risedronate sodium tablets to other people, even if they have the same symptoms you have. They may harm them.

What if I have other questions about risedronate sodium tablets?

This leaflet summarizes the most important information about risedronate sodium tablets for osteoporosis. If you have more questions about risedronate sodium tablets, ask your health care provider or pharmacist. They can give you information written for health care professionals. For more information, call 1-888-838-2872, MEDICAL AFFAIRS.

What are the ingredients of risedronate sodium tablets?

Risedronate sodium tablets (active ingredient): risedronate sodium monohydrate.

Risedronate sodium tablets (inactive ingredients): colloidal silicon dioxide, D&C yellow #10 lake (5 mg tablets only), FD&C yellow #6 aluminum lake (35 mg tablets only), hypromellose, iron oxide red (35 mg tablets only), iron oxide yellow, lactose monohydrate, magnesium stearate, polyethylene glycol, polysorbate 80, pregelatinized starch, sodium stearyl fumarate, starch, and titanium dioxide.

Manufactured In Israel By:

TEVA PHARMACEUTICAL IND. LTD.

Jerusalem, 91010, Israel

Manufactured For:

TEVA PHARMACEUTICALS USA

Sellersville, PA 18960

Iss. 8/2007

Revised: 03/2008

Distributed by: Teva Pharmaceuticals USA